1. The parameters of the transistor in the circuit in Fig. 1 are: β=100, $V_{BE(ON)}$=0.7 V, Early voltage V_A=∞. (a) Plot the small-signal equivalent circuit for the frequency of v_s is 0 Hz (3%); (b) Determine the quiescent and small-signal parameters of the transistor (8%). (c) Plot the small-signal equivalent circuit for the frequency of v_s is within the midband range (3%); Calculate the gain, input resistance, output resistance, -3dB corner frequencies associated with C_{C1} and C_{C2} (15%); (d) Sketch Bode plot of the voltage transfer function magnitude and phase for the circuit. (8%)

2. Consider the following circuit in Fig. 2 and assume ideal op-amps are used. The input voltage is v_I= sin(ωt). Determine the voltages v_{OB}, v_{OC}, v_O, and the voltage gain. (20%)

3. For the circuit in Fig. 3, the transistor parameters are: K_n=1 mA/V^2, V_{TN}=2V, λ=0, (a) Plot the small-signal equivalent circuit for the frequency of v_s is 0 Hz (3%); (b) Determine the quiescent and small-signal parameters of the transistor (8%). (c) Plot the small-signal equivalent circuit for the frequency of v_s is within the midband range (4%); Calculate the midband gain and 3dB corner frequency associated with C_C (8%).
4. Draw the circuit of a complete amplifier system, need to consist of reference voltage circuit, bridge circuit, and instrumentation amplifier circuit. (20%)

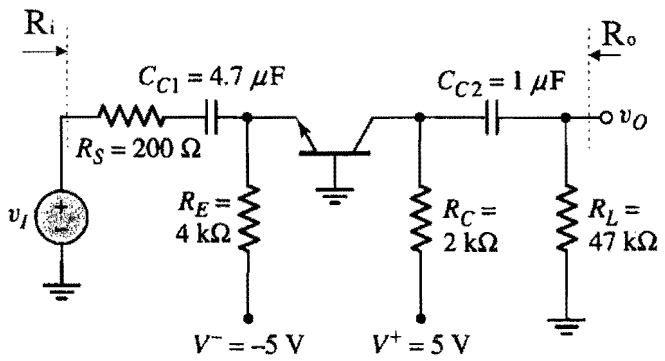

Fig. 1

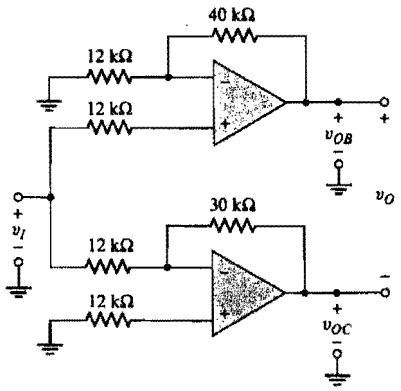

Fig. 2

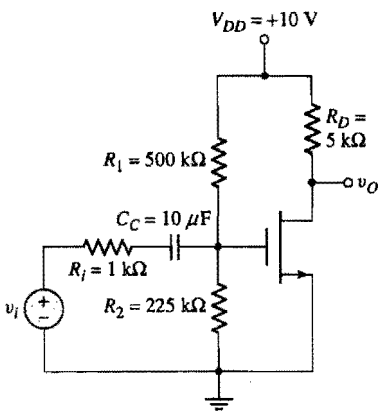

Fig. 3